What is claimed is:

1. A battery comprising:

a cathode,

an anode, and

an electrolyte,

wherein the electrolyte contains a high molecular weight compound, a solvent containing a high viscosity solvent whose boiling point is more than 150℃ and a low viscosity solvent whose boiling point is 150℃ or less, and an electrolyte salt; and the electrolyte is formed by firstly forming coating layer containing the high molecular weight compound, the high viscosity solvent, and the electrolyte salt on the cathode and the anode, and then injecting an injection solution containing the low viscosity solvent in the coating layer.

2. A battery according to claim 1, wherein a content of the electrolyte salt in the electrolyte is in the range of 0.36 mol/kg to 1.52 mol/kg in relation to the solvent.

3. A battery according to claim 1, wherein the electrolyte is formed by using the injection solution which contains an electrolyte salt in the range of 0.1 mol/kg to 3.5 mol/kg in relation to the low viscosity solvent.

4. A battery according to claim 1, wherein the electrolyte is formed by using the injection solution which contains an electrolyte salt in relation to the lower viscosity solvent having a higher concentration than a content of an electrolyte salt in relation to the high viscosity solvent in the coating layer.

5. A battery according to claim 1, wherein the electrolyte is formed by using the injection solution which contains ethyl methyl carbonate.

6. A battery according to claim 1, wherein the electrolyte is formed by using the injection solution which contains diethyl carbonate.

7. A battery according to claim 1, wherein the electrolyte is formed by using the injection solution which contains dimethyl carbonate.

8. A battery according to claim 1, wherein the electrolyte is formed by using the injection solution which further contains $LiPF_6$.

9. A battery according to claim 1, wherein the electrolyte is formed by using the injection solution which further contains $LiN(SO_2CF_3)_2$.

10. A battery according to claim 1, wherein the electrolyte is formed by using the injection solution which further contains $LiN(SO_2C_2F_5)_2$.

11. A battery according to claim 1, wherein the electrolyte is formed by using the injection solution which further contains $LiBF_4$.

12. A battery according to claim 1, wherein the anode comprises an anode current collector and an anode mixture layer provided on the anode current collector, and a

volume density of the anode mixture layer is from 1.0 g/cm^3 to 2.2 g/ cm^3.

13. A battery according to claim 1, wherein the anode comprises an anode current collector and an anode mixture layer provided on the anode current collector, and an average void diameter of the anode mixture layer is from 0.2 μm to 5 μm.

14. A battery according to claim 1, wherein the cathode, the anode, and the electrolyte are housed inside of a film exterior member.

15. A battery, wherein:

a cathode and an anode are faced with an electrolyte in between,

the electrolyte contains a high molecular weight compound, a solvent containing a high viscosity solvent whose boiling point is more than 150℃, and a low viscosity solvent whose boiling point is 150℃ or less, and an electrolyte salt,

a concentration of the low viscosity solvent in the electrolyte changes in the facing direction of the cathode and the anode, and the concentration of the low viscosity solvent in the electrolyte is higher between the cathode and the anode compared to on the cathode side and the anode side.